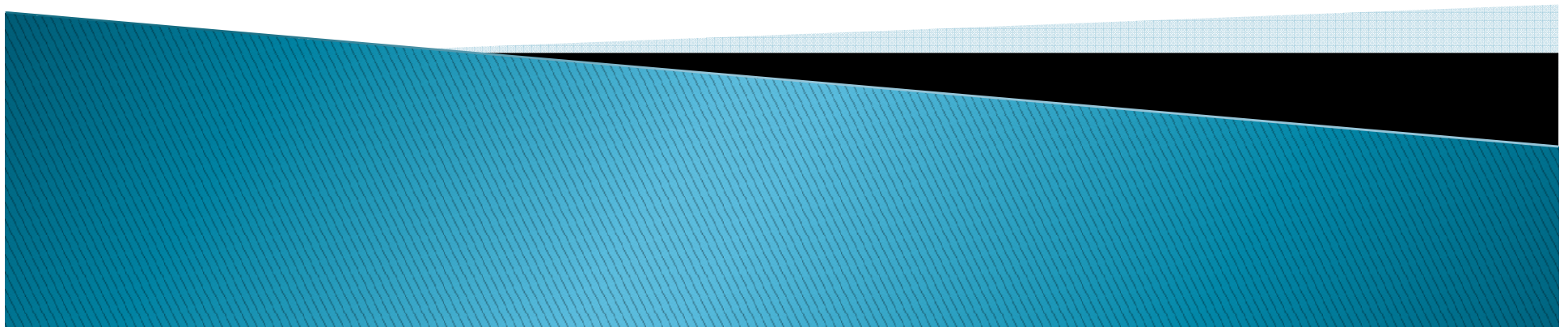
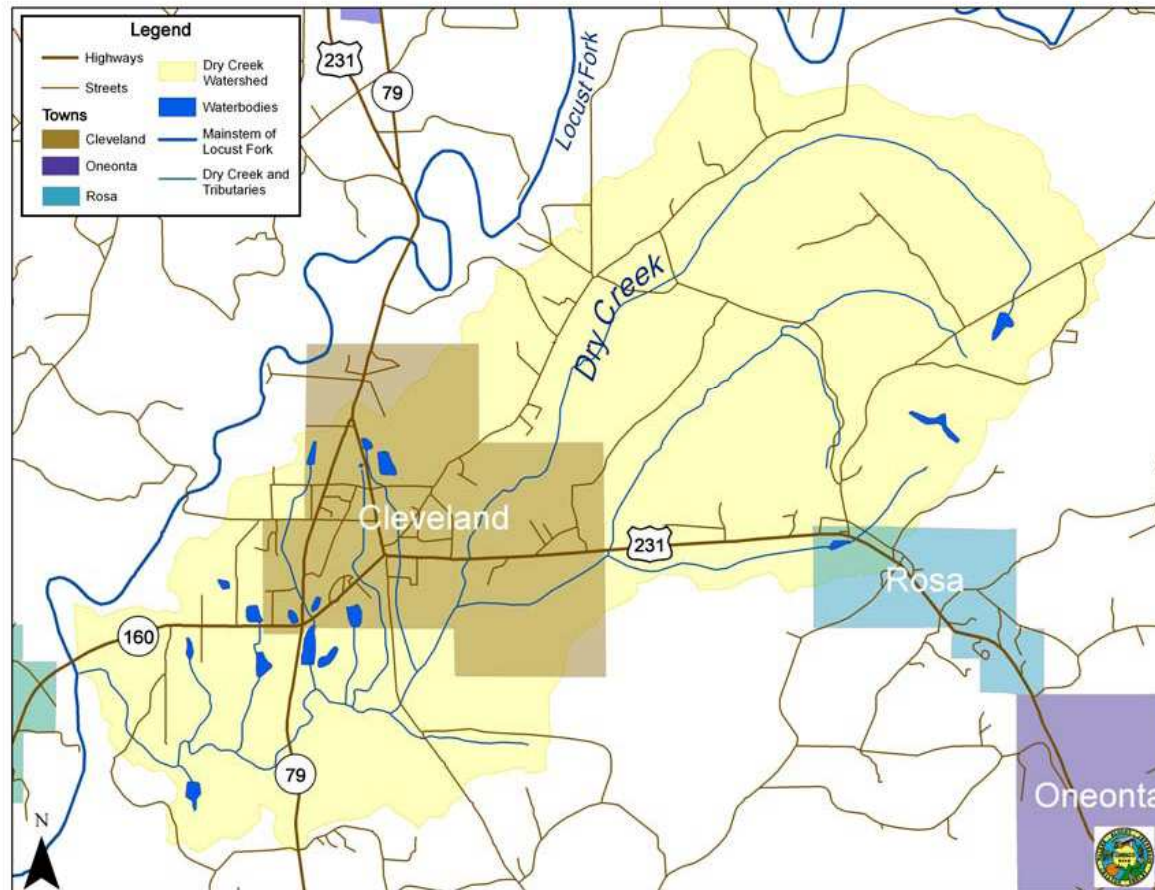


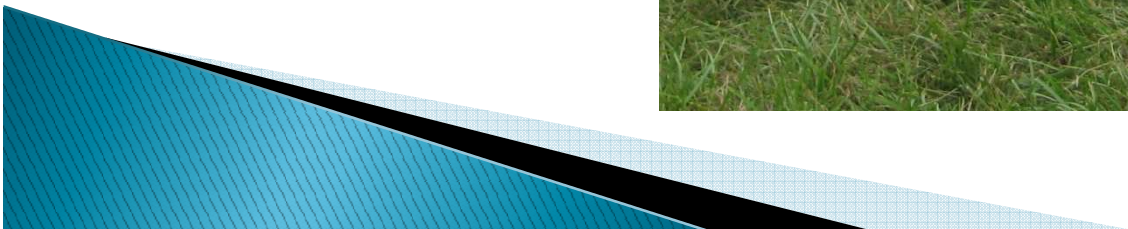
Dry Creek Watershed Phase II



Dry Creek Watershed



The Spark



Heavy Use Area



Before Installing BMP



After Installing BMP

Heavy Use Area



Before Installation of
BMP



After Installation of BMP
BMP

Heavy Use Area for Feeding Cattle



Before BMP Installed



After BMP Installed

Heavy Traffic Area for Cattle



Heavy Use Area for Feeding Cattle



Before Installation of
BMP



After Installation of BMP

Converting Pasture Land into Forest Land



After Chemical Site Prep

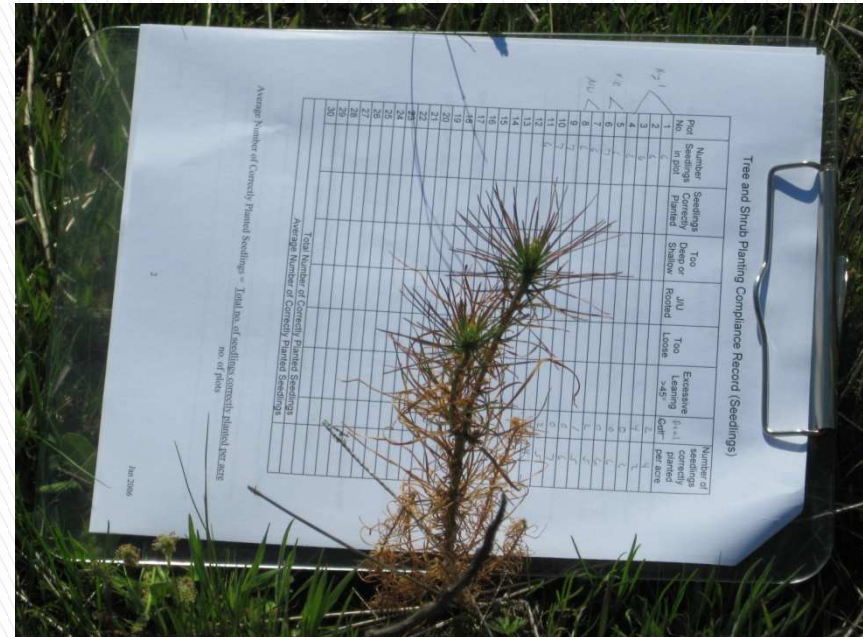


After Tree Planting

Tree Planting



Chemical Site Prep



Loblolly Pine Trees Planted

Cross Fence for Rotational Grazing



Installed BMP



Installed BMP

Cross Fence for Rotational Grazing



Installed Cross Fence



Installed Cross Fence

Fenced Cattle Out of Pond

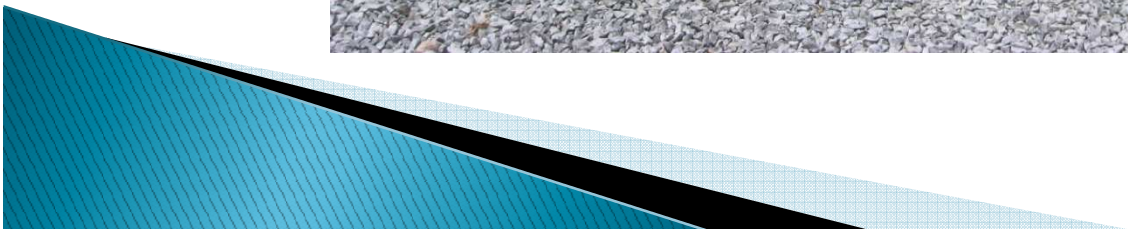


Erosion Caused by
Cattle



Watering Facility
Installed Below Pond

Installed Pipe Crossing



Pasture Planting for Cattle



Fungus Free Fescue



Fungus Free Fescue

Streambank and Shoreline Protection



Streambank Before
Installing BMP



Streambank After
Installing BMP

Streambank and Shoreline Protection



Streambank Before
Installing BMP



Streambank After
Installing BMP

Septic Tank Pump-Out Workshop



Education



Soil Tunnel



Soil Tunnel

Education



Touch Screen Learning
Stations



Combine Simulator

Education



Hamburger and Hotdog



“Maggie” The Milk Cow

Education



Edible Aquifer @ Multi-Needs School



Earth Day @ Cleveland High School

Groundwater Festivals

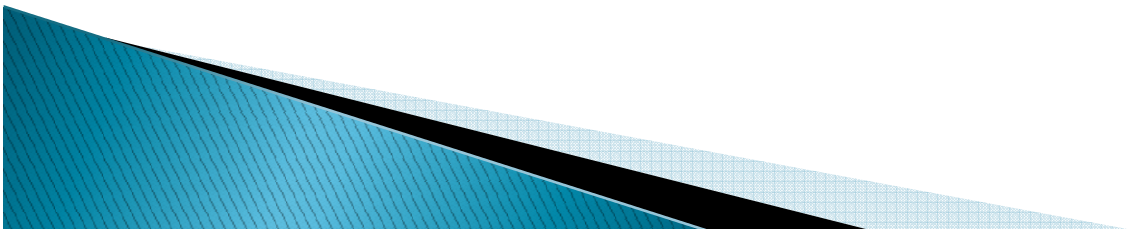


Water Cycle Bracelets



Edible Aquifer

Our Future





Dry Creek

James Mooney
ADEM, Water Quality

Dry Creek

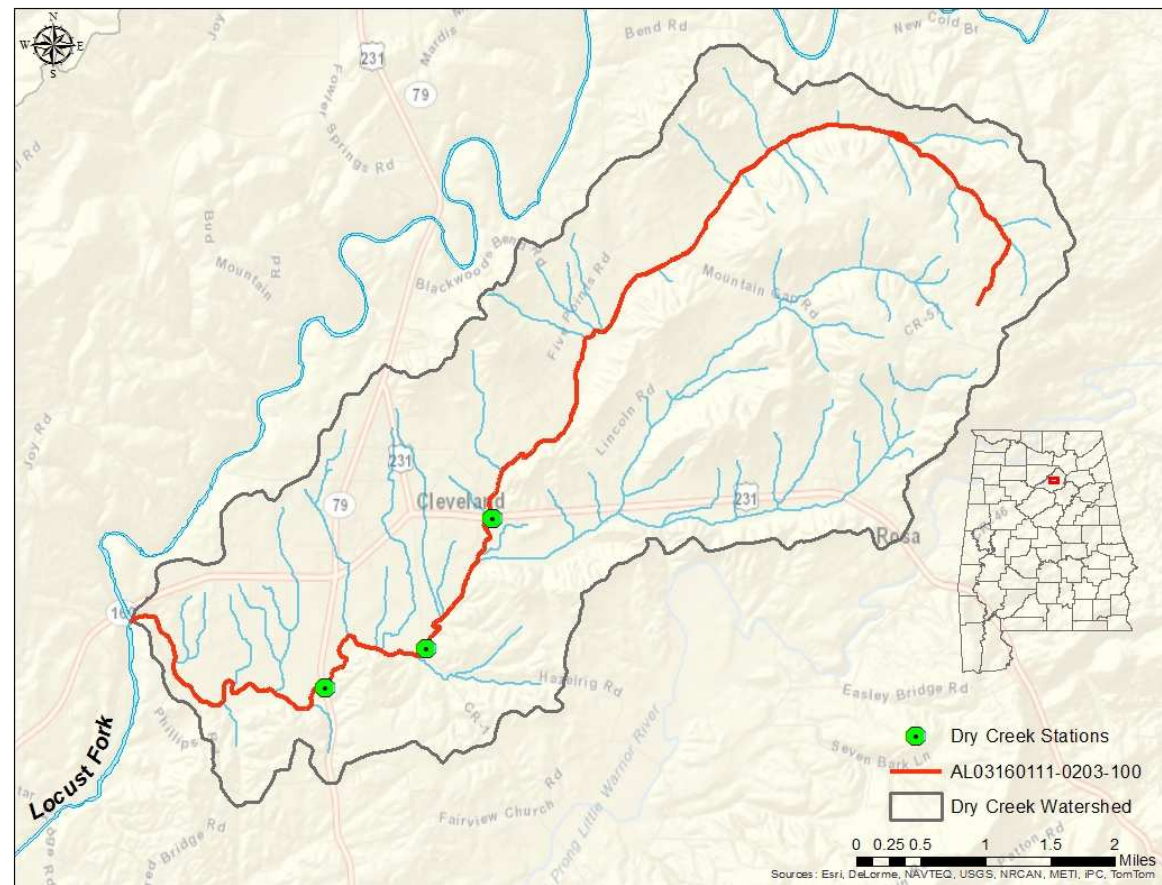
- Black Warrior River Basin
- Town of Cleveland, Blount County

Alabama's 2014 303(d) List

Total Length: 12.00 miles

From : Locust Fork

To: Its Source





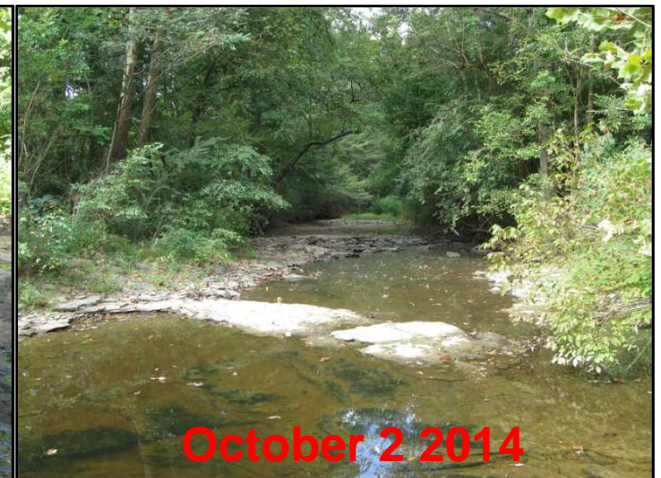
Background

- Currently Listed on Department's 2014 303(d) List of Impaired Waters for:
 - Nutrients
 - Organic Enrichment
- Listed Sources: Municipal, Pasture Grazing
- Pathogen TMDL completed in 2009
- Dry Creek Ammonia Delisting Document completed in 2012

ADEM



As the name suggests.....

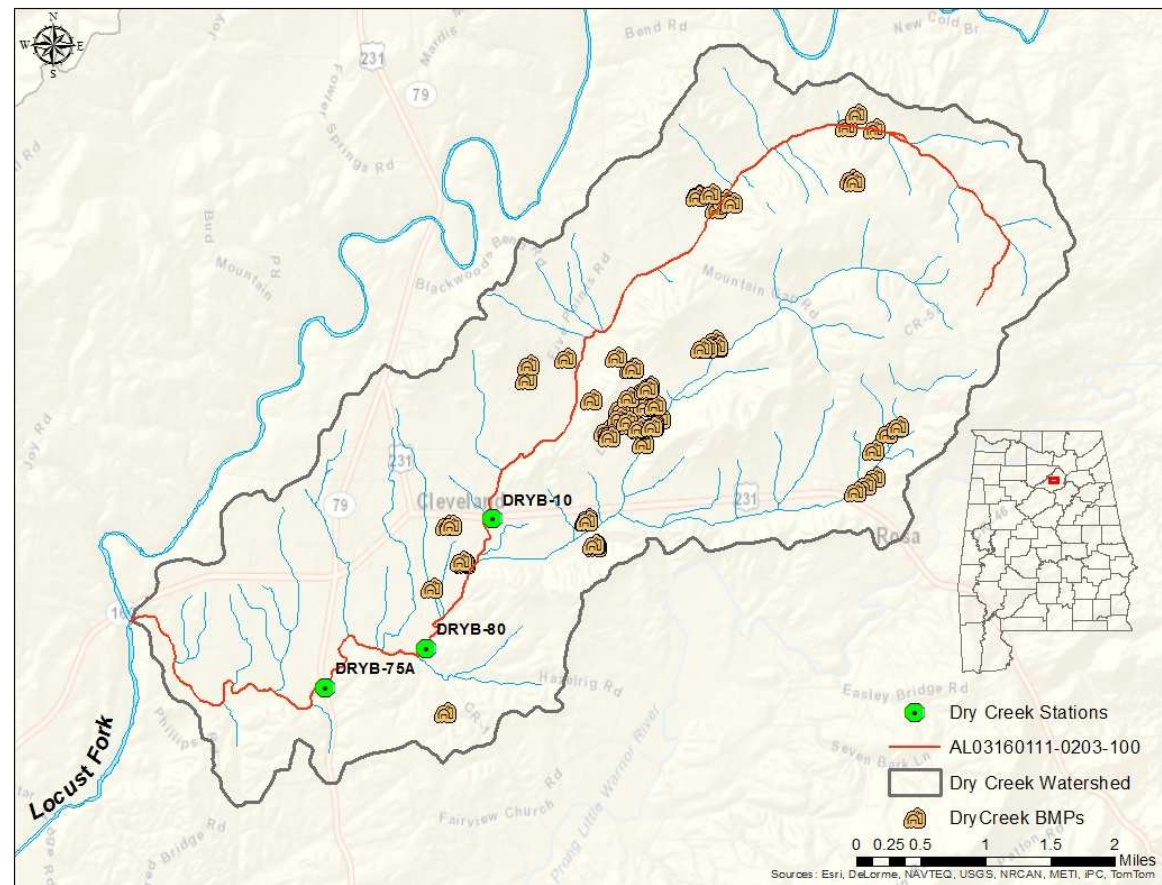




Dry Creek Watershed Projects

Phase 1 and 2 projects completed in watershed from 2007 to 2013.

Numerous Best Management Practices (BMPs) implemented throughout the watershed.



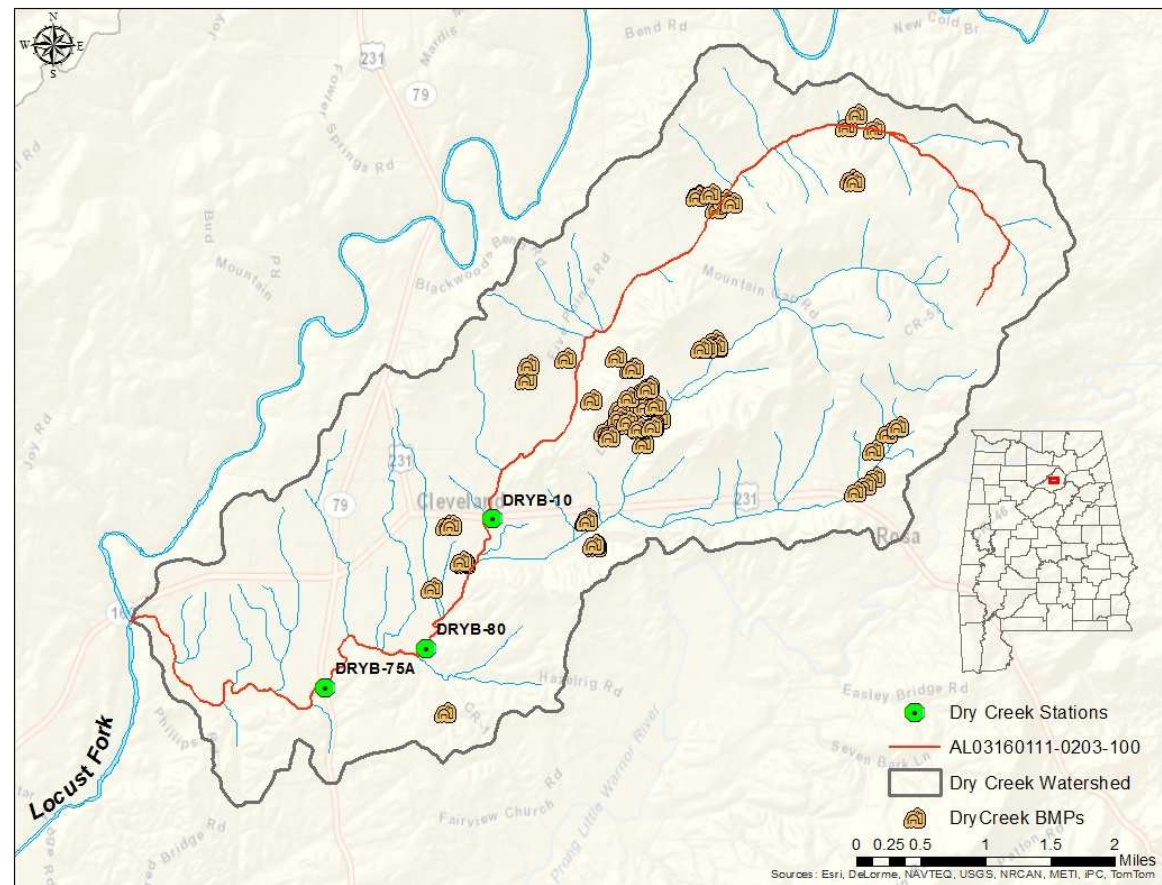
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Dry Creek 2014 Sampling

ADEM's 2014 Nonpoint Source (NPS) post-BMP sampling efforts

- Goal of the project was to gain a better understanding of the water quality conditions in Dry Creek following the implementation of the numerous agricultural best management practices in the watershed during 2007 to 2013.



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Dry Creek 2014 Sampling

- Three Stations Sampled (DRYB-10, DRYB-80, DRYB-75A)
- Monthly Samples: March – October (8 Total)

Physical Parameters:

- Temperature
- Stream Flow
- Specific Conductivity
- Alkalinity
- Turbidity
- Total Dissolved Solids
- Total Suspended Solids

Chemical Parameters:

- Dissolved Oxygen
- pH
- Ammonia Nitrogen
- Nitrate + Nitrite Nitrogen
- Total Kjeldahl Nitrogen
- Total Nitrogen
- Dissolved Reactive Phosphorus
- Total Phosphorus
- CBOD5
- Chlorides

Biological Parameters:

- Chlorophyll a
- E. coli

The Department does not currently have numeric nutrient criteria for wadeable streams.

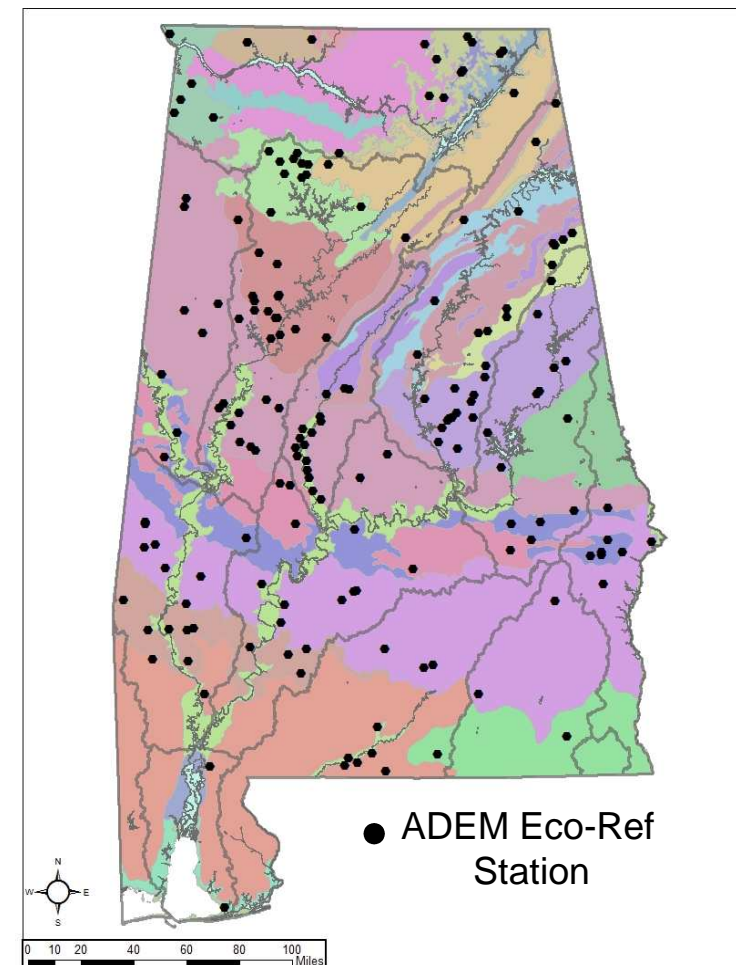
Eco-Reference Guideline Approach

Reference streams are defined as relatively uniform areas of similar ecological characteristics which have remained relatively undisturbed or minimally impacted by human activity over an extended period of time in relation to other waters of the State.

Reference streams represent desirable chemical, physical and biological conditions for a given ecoregion that can be used for evaluation purposes.

Dry Creek watershed is entirely located within the Level IV Ecoregion 68d – Southern Table Plateaus.

Alabama Level IV Eco-regions





Dry Creek 2014 Results

Total Phosphorus

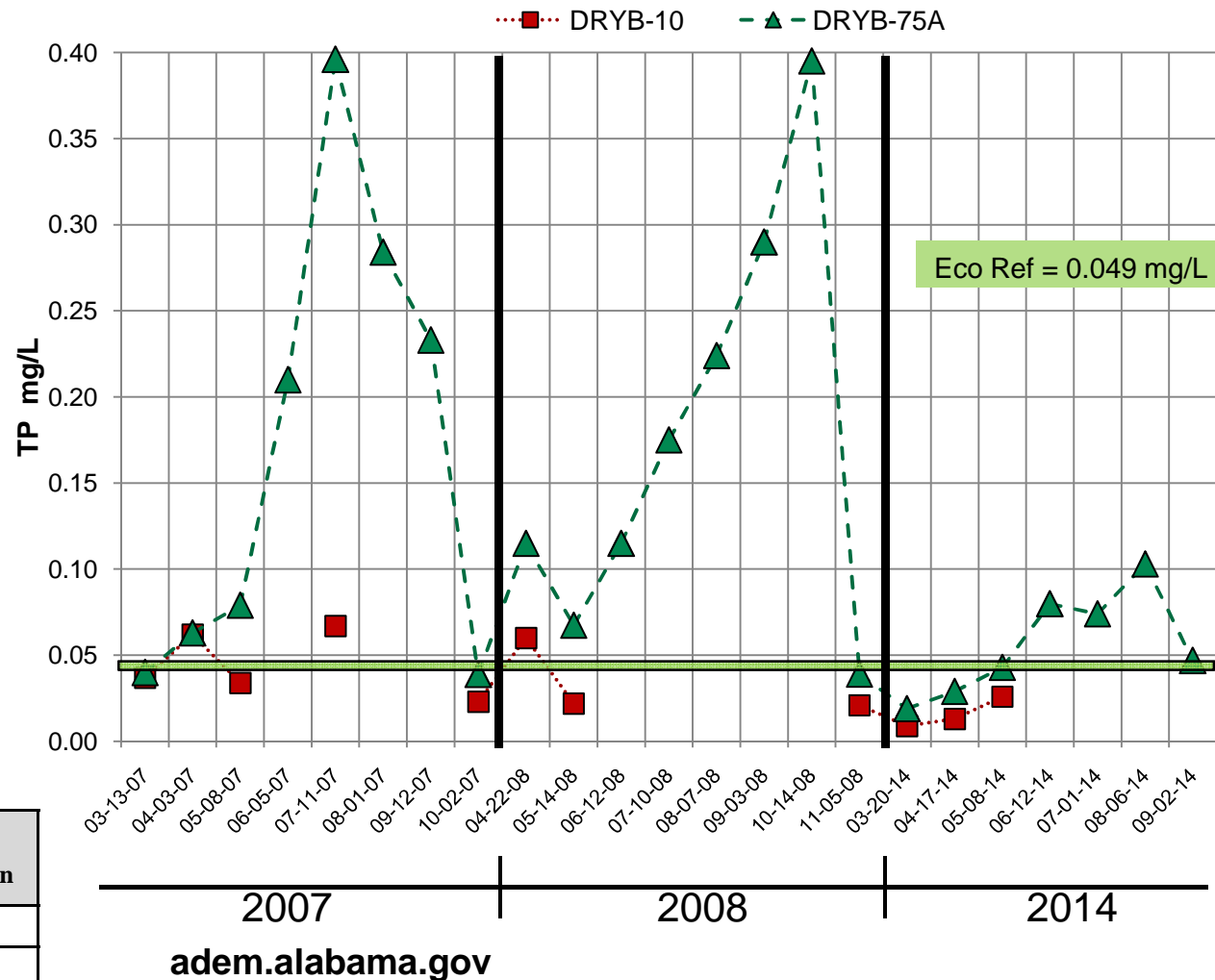
Eco-reference Guideline
Total Phosphorus = 0.049
mg/L

Station DRYB-10

2014 Median Total
Phosphorus = 0.020 mg/L

Station DRYB-75A

2014 Median Total
Phosphorus = 0.045 mg/L



Station	2008 Average TP	2014 Average TP	Percent Reduction
DRYB-10	0.035	0.018	49%
DRYB-75A	0.178	0.054	70%



Dry Creek 2014 Results

Total Nitrogen

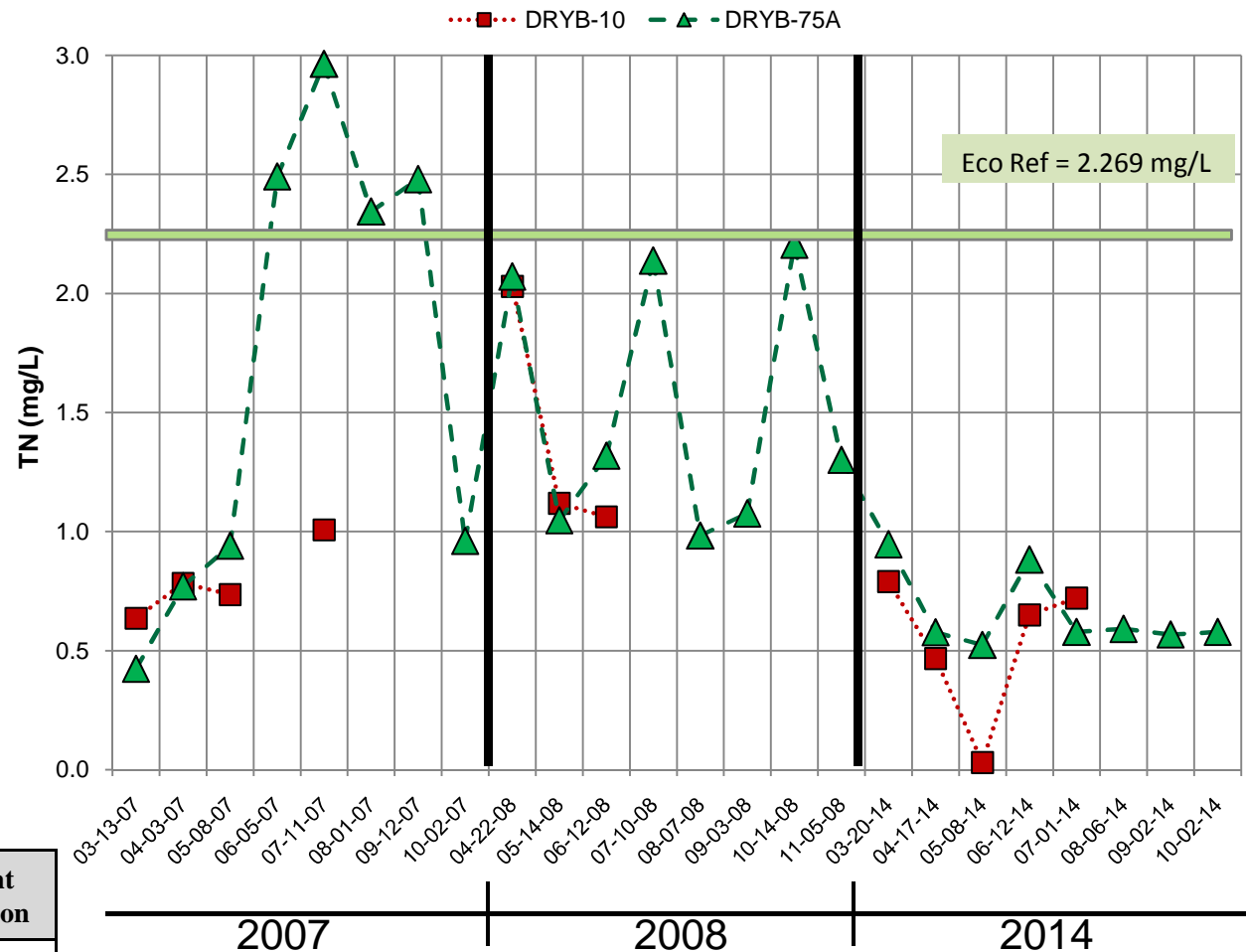
Eco- reference Guideline
Total Nitrogen = 2.269 mg/L

Station DRYB-10

2014 Median Total Nitrogen =
0.703 mg/L

Station DRYB-75A

2014 Median Total Nitrogen =
0.578 mg/L



Station	2008 Average TN	2014 Average TN	Percent Reduction
DRYB-10	1.404	0.666	53%
DRYB-75A	1.517	0.655	57%



Dry Creek 2014 Results

Total Kjeldahl Nitrogen (TKN)

-TKN = NH₃ + TON

-Used as a surrogate to track NBOD

Organic Enrichment
(CBDO, NBOD)

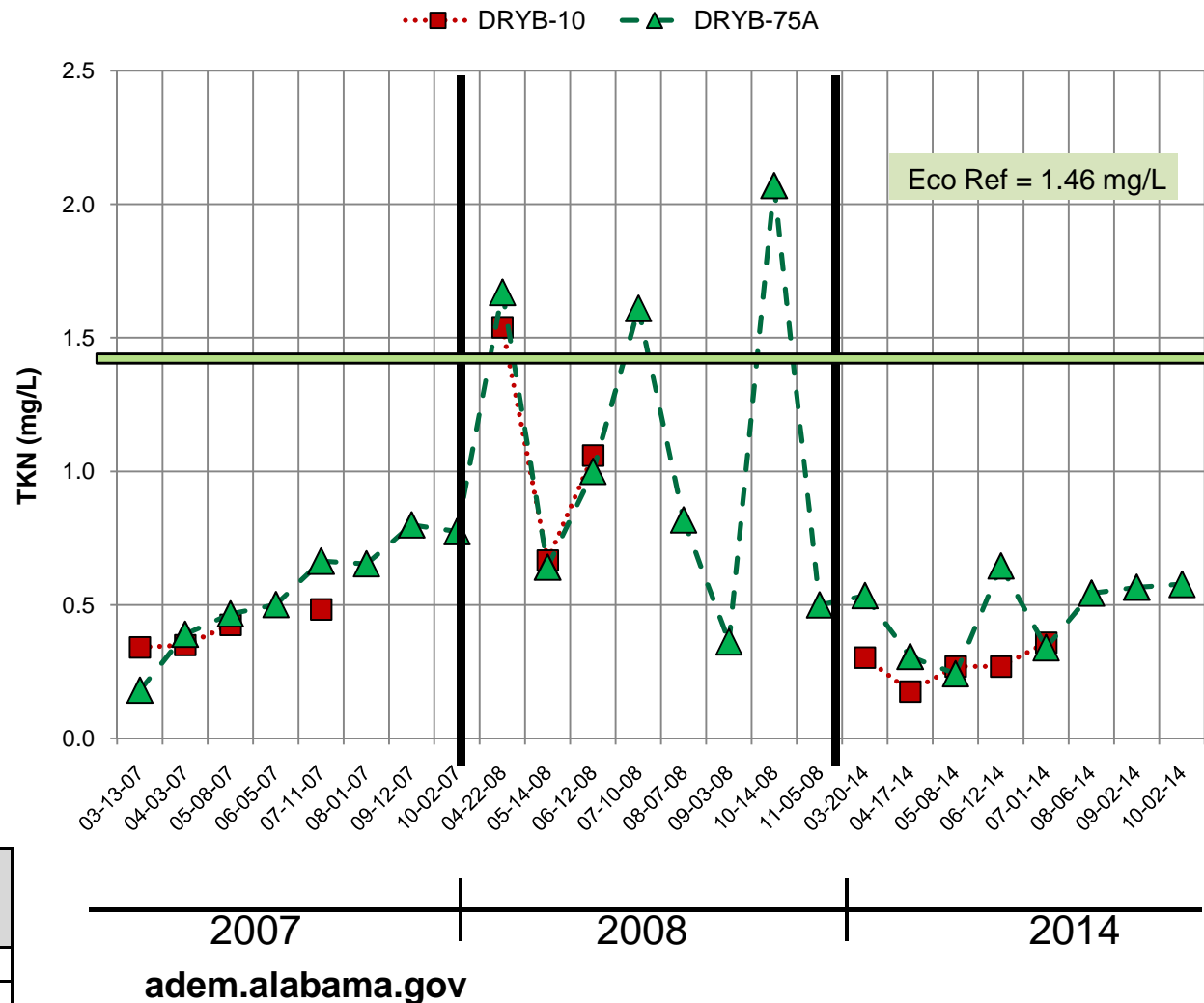
Eco- reference Guideline TKN =
1.460 mg/L

Station DRYB-10

2014 Median TKN = 0.270 mg/L

Station DRYB-75A

2014 Median TKN = 0.540 mg/L



Station	2008 Average TKN	2014 Average TKN	Percent Reduction
DRYB-10	1.089	0.276	75%
DRYB-75A	1.084	0.470	57%

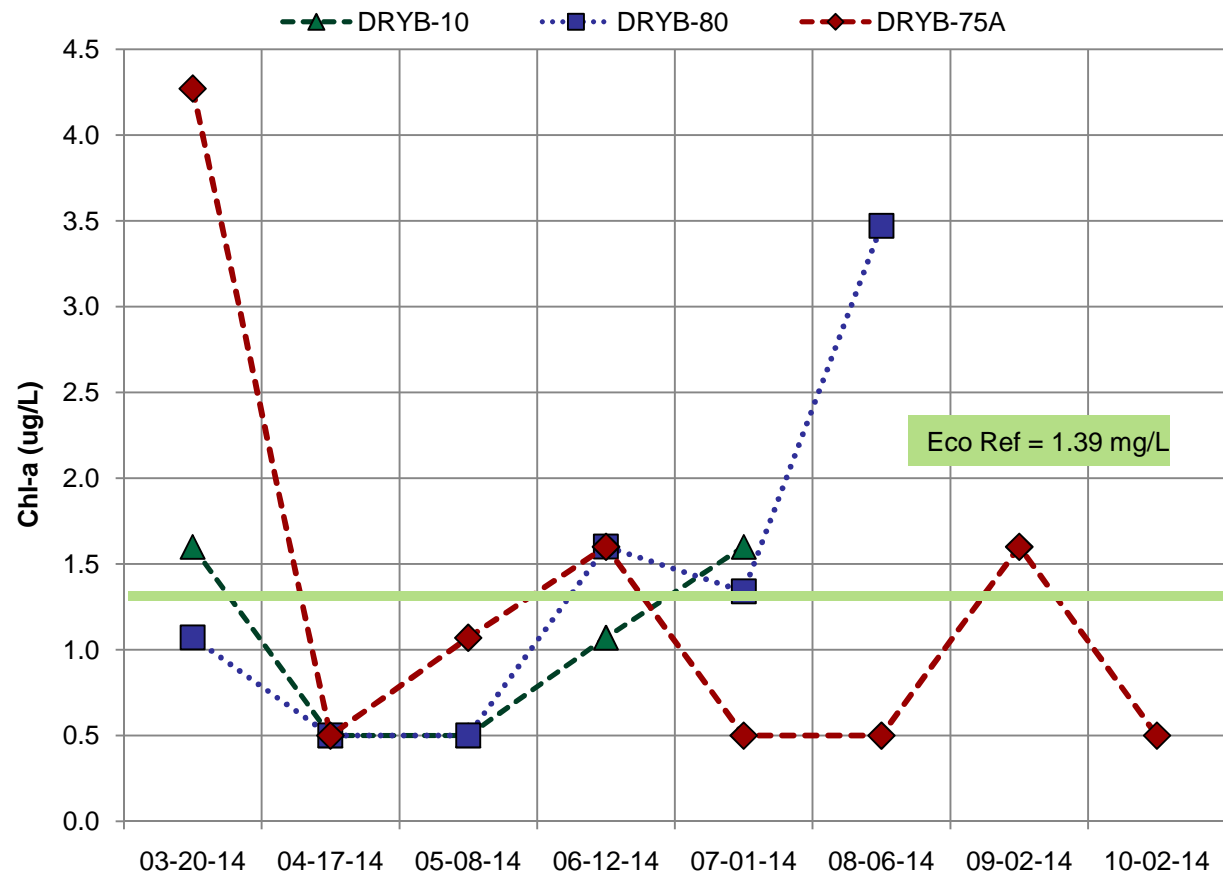


Dry Creek 2014 Results

Chlorophyll-a, a photosynthetic pigment and sensitive indicator of algal biomass, is considered the most important biological response variable for nutrient-related impairment problems.

Elevated chlorophyll a concentrations are indicative of a high presence of algal growth, which in turn affects the dissolved oxygen balance through photosynthesis, respiration, and the regeneration of organic materials.

Therefore, the Department also focuses on instream chlorophyll a concentrations to evaluate if a nutrient related impairment exists.



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Station	# Samples	Median	# of Samples @ MDL
DRYB-10	5	1.07	2
DRYB-80	6	1.21	2
DRYB-75A	8	1.04	4



Conclusion

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